ENERGY INFORMATION PAPER

PARALLEL GENERATION IN ONTARIO

Ontario
Ministry of Energy
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Energy Ontario

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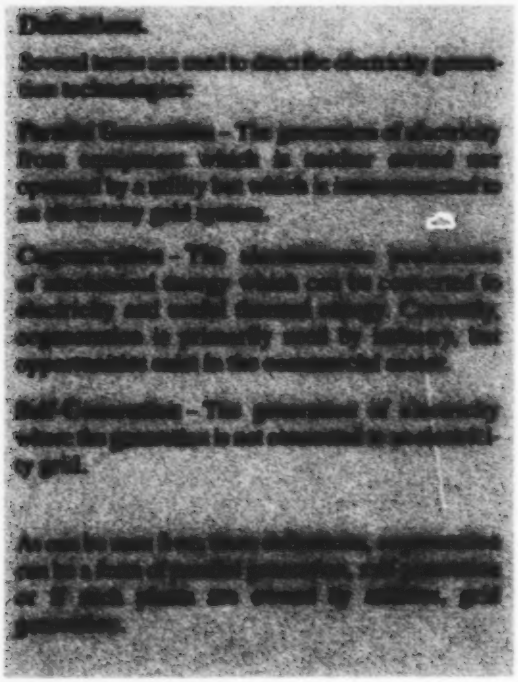
INTRODUCTION

What is Parallel Generation?

Parallel Generation has been defined as the operation of electrical generation equipment which is neither owned nor operated by a utility, but which is interconnected to the electricity grid system. Sources of parallel generation include hydroelectric power, wind power, and solar-electric power. Cogeneration may also be developed as parallel generation. Cogeneration involves the simultaneous production of useful heat and electricity using conventional fuels such as coal, oil, or natural gas, or other fuels such as wood, or wood waste.



Why is there an interest in Parallel Generation?

In Ontario there are currently approximately 600 megawatts (MW) of electricity generation which can be classified as parallel generation. There are a further 500 megawatts of generation either owned by private or municipal utilities or which are not connected to the grid.

While small in relation to total Ontario Hydro electricity generation capacity (28,000 MW in 1985), electricity produced by parallel generators is enough to meet the needs of 500,000 average residential customers. Installed parallel generation capacity represents an investment of nearly $1 billion.

The existing parallel generation capacity in Ontario has been developed to take advantage of special situations which existed in various regions of the province. Many industries can use cogeneration to supply energy at costs lower than those possible from the separate use of conventional fuels for heat and electricity from the provincial grid.

In other industries (such as the forest products industry), wood waste is burned to produce heat and/or electricity. The waste is a cheap source of fuel, and burning the waste materials reduces the waste volume and thus the costs of disposal.

The possibility of burning municipal waste to produce useful energy and reduce municipal landfill requirements is also an option for some municipalities. Hydraulic sites have also been tapped to provide low-cost electricity. In the future, windmills and photovoltaic cells may become an economic form of parallel generation as well.

Wood waste from the forest products industry

Making better use of parallel generation opportunities is important to Ontario for a number of reasons. In the private sector there is considerable potential to reduce energy costs and to generate additional revenues. The government is interested in parallel generation because it offers the opportunity to increase energy security and to increase the amount of flexibility and diversity in the provincial electricity system. In addition, increased parallel generation in the province would provide opportunities for industrial growth.

Scope of this Paper

This paper describes the present environment for the development of parallel generation, the present state of development of the technologies which can be used for parallel generation, and identifies the factors which should be considered when identifying, analysing and evaluating parallel generation opportunities in Ontario.

THE BACKGROUND TO PARALLEL GENERATION

Development Around the World

Parallel generation has a long history around the world and has become increasingly popular in a number of countries. In Denmark and Germany, for example, regional or city authorities have been active as electricity generators for many decades. Independent power producers have played an important role in meeting national electricity needs.

In England and the United States, increased electricity production by parallel generation has been encouraged by specific legislation. In both countries, statutes introduced in the mid-1970s required utilities to purchase electricity from small power producers and to offer rates based on the avoided cost of generation for the utility involved. In the United States, over 5,000 MW of new capacity has been constructed in the past five years. Parallel generation is seen as a way of tapping a diverse set of energy sources and increasing the general efficiency of energy use.

Development in Ontario

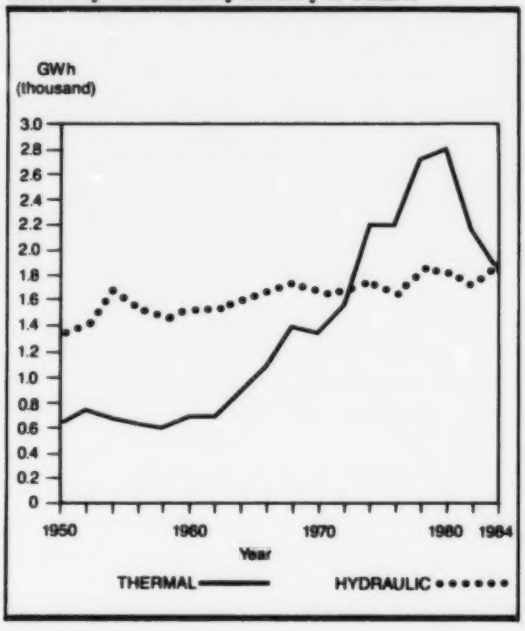
Electricity usage in Ontario began in the early 1880s, when telegraph batteries were first used for arc-lights. Soon after, a water wheel lit arc-lights in a few mills. By the late 1890s, private firms were using small-scale hydraulic developments for electricity production.

At the turn of the century, wood which had once fuelled the boilers of factories was no longer abundant. The water wheel was not an efficient power converter, and coal imported from the United States had dramatically increased in price. These factors, as well as the developing technology to transmit electricity over long distances, led to considerable interest in large hydraulic sites, especially at Niagara Falls.

As more experience was gained with electricity generation technologies, and as the demand for electricity grew, other hydraulic sites with the potential for large generating stations were developed, and the proportion of independently-produced electricity generation declined. The economies of scale that were captured by constructing larger generator units meant that small power production became relatively less economic. It was not until the 1970s that a shift occurred in the economics of small power production, and interest in parallel generation began to develop again.

The figure below shows the energy production from industrial hydraulic sources and from thermal facilities in the province over the last 40 years.

Electricity Generation by Industry in Ontario



Existing Policies

In Canada, electricity production falls within the jurisdiction of the provincial governments.

Federal

The federal government has a variety of policies of interest to parallel generators. However, since electricity generation is under provincial jurisdiction, federal policies are more generally related to "off-oil" strategies and apply only indirectly to parallel generation.

Federal support of renewable energy technologies has been demonstrated in part in the provisions for fast write-off of equipment for some technologies under tax class 34. This initiative indirectly supports many parallel generation technologies. Grants have also been available under a variety of federal programs such as FIRE (i.e. Forest Industries Renewable Energy program). These programs were designed to support the use of waste as a primary energy source or for the replacement of oil as a fuel.

The Conservation and Renewable Energy Demonstrations Agreement (CREDA) program and the Enerdemo Program, conducted in co-operation with the provincial governments, have assisted small hydro demonstration projects in several provinces, including Ontario. Other demonstration funds have been made available for biomass conversion systems.

Photovoltaic technology is also receiving Federal funds for basic research and development.

Wind generators of various types are being developed with federal and provincial assistance for electricity grid connection in areas that have consistently high wind speeds.

Ontario

The Province of Ontario has supported various technologies that can be used for parallel generation for several years. A variety of support programs were spelled out in a document entitled, "Energy Security for the Eighties", released by the Ontario Ministry of Energy in September 1979. Use within the province of indigenous energy sources, such as wind, solar, energy from waste, and hydraulic, was encouraged, and all are appropriate for use in parallel generation projects. Programs to assist the development and demonstration of small hydro technologies, wind power, photovoltaics, and municipal solid waste were also established, and more recently, policy direction was given to Ontario Hydro instructing that organization to support the private generation of electricty.

A wind turbine under test near Sudbury

Ontario legislation currently provides for electricity generation by private interests as well as public utilities, but forbids the sale of electricity between private individuals in an enfranchised jurisdiction. Individuals may generate electricity at one site, and with the agreement of the utilities involved, may use the provincial grid to transmit that electricity to another location (to "wheel" the power) if the users at both locations are owned by the same entity.

Ontario Hydro

The governing principle for parallel generation stated by Ontario Hydro is as follows: "Ontario Hydro will support private parallel generation by providing technical information on feasibility and economics for potential parallel generation projects in Ontario and by purchasing electricity from such sources." (1982)

On January 1, 1985 a new pricing system for purchasing electricity from parallel generators was put in place by Ontario Hydro. This system was intended to support parallel generation and to more accurately reflect the value of parallel generation in comparison to future generating capacity which Ontario Hydro would have to provide. Prior to 1985 rates were based on the average cost of generation. The newer rates take into account projected future costs as well as current costs.

The rates effective January 1, 1986 were 3.45 cents and 2.45 cents per kilowatt-hour, depending on the availability of the power. The higher rate is for power from generators which run at least 65 per cent of the time. Current contracts guarantee an increase in the purchase rate for the next five years which is no less than the rate of general inflation across the economy as measured by the consumer price index. Under the current rate structure, metering costs for small power producers, transmission losses, and administration charges are absorbed by Ontario Hydro.

Current rates information is available from Ontario Hydro as described in the final section of this paper.

Ontario Hydro's policy is to allow interconnection and sales to the electricity grid as long as a number of technical conditions (see the references described in the last section of this paper) are met to ensure safety on the site and within the grid.

Time-differentiated rates are available to generators with capacities greater than 250 kW. Also, reduced rates are available for large suppliers wishing to deliver energy on an occasional basis only.

Ontario Hydro has agreed in the past to use the transmission grid to "wheel" power to other sites as long as both sites, and the generator producing the power to be wheeled, are owned by the same entity. A fee is charged based on the amount of power wheeled and the distance involved.

Municipal and Private Utilities

i) Municipal Utilities

Municipal utilities provide electric power to most of the industrial, commercial and residential customers in Ontario. Many parallel generation opportunities exist within areas served by these utilities, and so their policy concerning interconnection is important. Ontario Hydro policy is to allow municipal utilities the first right to purchase electric power from parallel generators within their service area.

Each municipal utility is responsible for deciding on the overall approach to be taken with regard to parallel generation. There is no specific policy in place in many utilities. However, following discussions of the power costing committee of the Association of Municipal Electrical Utilities of Ontario (AMEU) it has been recommended that Ontario Hydro's approach to parallel generation should be used as a model. It has also been recommended that the price paid for electric power should not exceed the wholesale price paid by the utility to Ontario Hydro. The average wholesale price of electricity in Ontario, expressed on an energy basis is about four cents per kilowatt-hour.

A number of municipal utilities have been approached by potential parallel generators. Most utilities have shown a willingness to purchase the electric power and to pay a price related to their cost of electrical power from Ontario Hydro.

ii) Private Utilities

Several private companies currently provide power to retail customers, and are therefore considered to be private utilities.

These companies use their own generation to serve as much of their load as possible, and purchase electric power from Ontario Hydro to serve the remaining load.

Attitudes towards interconnection and purchase of electric power vary, but a willingness has been expressed by these utilities to negotiate with parallel generators on all aspects of the purchase of power. The rate would likely reflect the cost of generation within the utility system and the cost of buying power from Ontario Hydro.

THE PRESENT STATE OF PARALLEL GENERATION IN ONTARIO

The established types of generation used in Ontario for parallel generation are hydroelectric and cogeneration. Together these technologies provide approximately 1,100 megawatts of electricity generation which is independant of that owned by Ontario Hydro.

The potential exists for an increase in the use of these technologies as well as a number of other energy sources that can be employed for parallel generation. Technological development is taking place in areas such as wood and wood waste, municipal solid waste, photovoltaics, wind generators, fuel cells and total energy units. If this development continues, these sources may have a greater role to play in future contributions to Ontario's electric power needs. An increase in the price of fossil fuel-based energy sources could also increase the economic potential of parallel generation.

Electrical Generation Capacity in Ontario (1983)

Technology	Presently Installed (MW)	
Owned by Ontario Hydro		25,300*
Not Owned by Ontario Hydro		
Thermal Generation (including cogeneration)	470	
Hydroelectric	688	
Energy from Waste	4	
Wind	+	
Photovoltaics	+	
Total Energy Units	+	
Fuel Cells	+	
Total		1,162

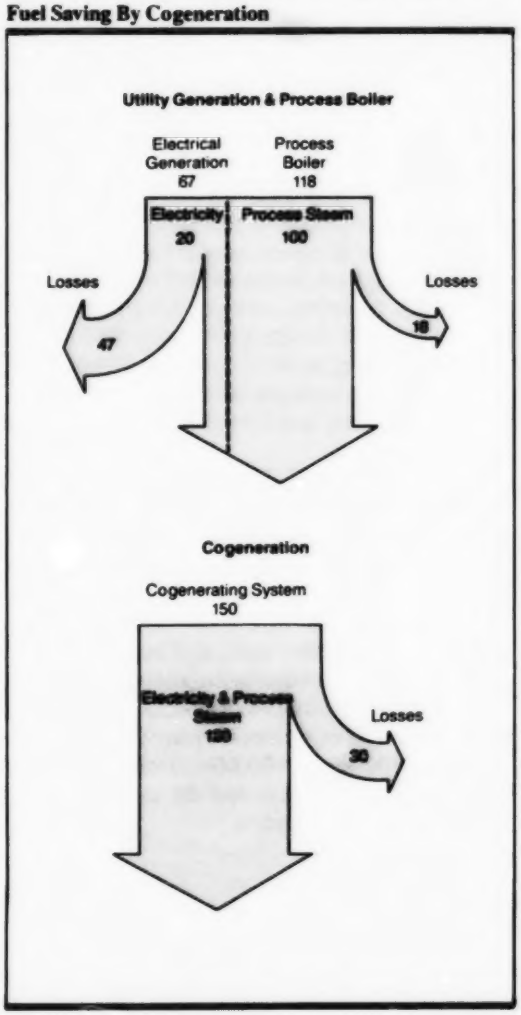
+ less than 1 MW.

*Total Ontario Hydro capacity at the end of 1985 was 28,000 MW

Cogeneration

Cogeneration is the simultaneous production of electricity and thermal energy (in the form of steam, hot liquids or gases) from a single energy source. It can raise the fuel conversion efficiency of a system to as high as 80%. By comparison, a conventional power station generating only electricity has a fuel conversion efficiency of approximately 35 percent.

Fuel Saving By Cogeneration



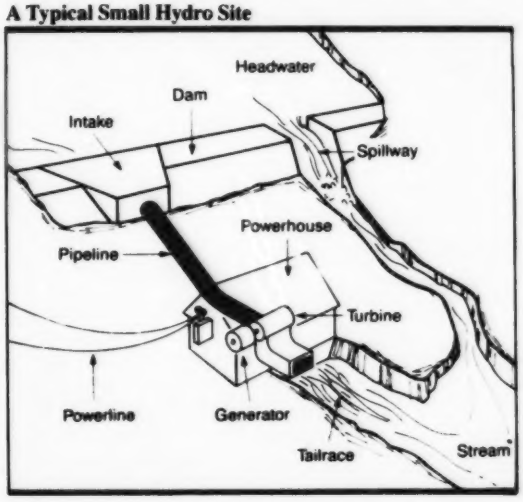
There are many ways to apply the principle of cogeneration in industry, institutions and in commercial buildings. The greatest opportunities exist in the chemical and pulp and paper industries where, because the demand for steam and electricity can be readily balanced, the operation is economically feasible without large electricity sales to the utility. Current trends in the price of natural gas and electricity are likely to stimulate natural gas-based cogeneration.

Cogeneration presents considerable immediate potential to offset the need for new conventional generation in most parts of Ontario. Development of cogeneration capacity in the more remote parts of each province, especially at pulp and paper mills, could be of particular value, since these developments often offset the need for major new transmission lines.

Hydroelectric Stations

Water power has always been an important energy resource in Ontario, and both large and small hydroelectric power stations have been built by independent developers. Currently in Ontario there is over 600 MW of hydroelectric generation owned by municipal or private utilities or operated as parallel generation. Much of this capacity is at large developments in Northern Ontario.

A Typical Small Hydro Site



Small hydraulic development, which is well established in Ontario, was until recently, declining. The rise in energy prices in the 1970s and concern for the environment and for energy security reversed this trend. Small automated machines with improved efficiency have been developed in the past decade, and offer the potential to further improve the economics of small hydraulic developments in the future.

In Ontario, there has been considerable progress in the field of non-utility small hydro. In total, over 40 feasibility studies, major conferences, on-site demonstration projects and privately-financed developments have been completed. This progress has provided concrete evidence of strong private sector interest in this technology.

The total of new private hydroelectric capacity could eventually reach 500 MW. A major thrust in small hydro may be the development of private hydroelectric sites by entrepreneurs who wish to sell their total production to Ontario Hydro and the municipal utilities. Such arrangements have been very rare in the past but recently generators which sell all of their outputs to the grid have been established in Ontario (for example, the Hurdman Dam, near North Bay) in Nova Scotia, and British Columbia.

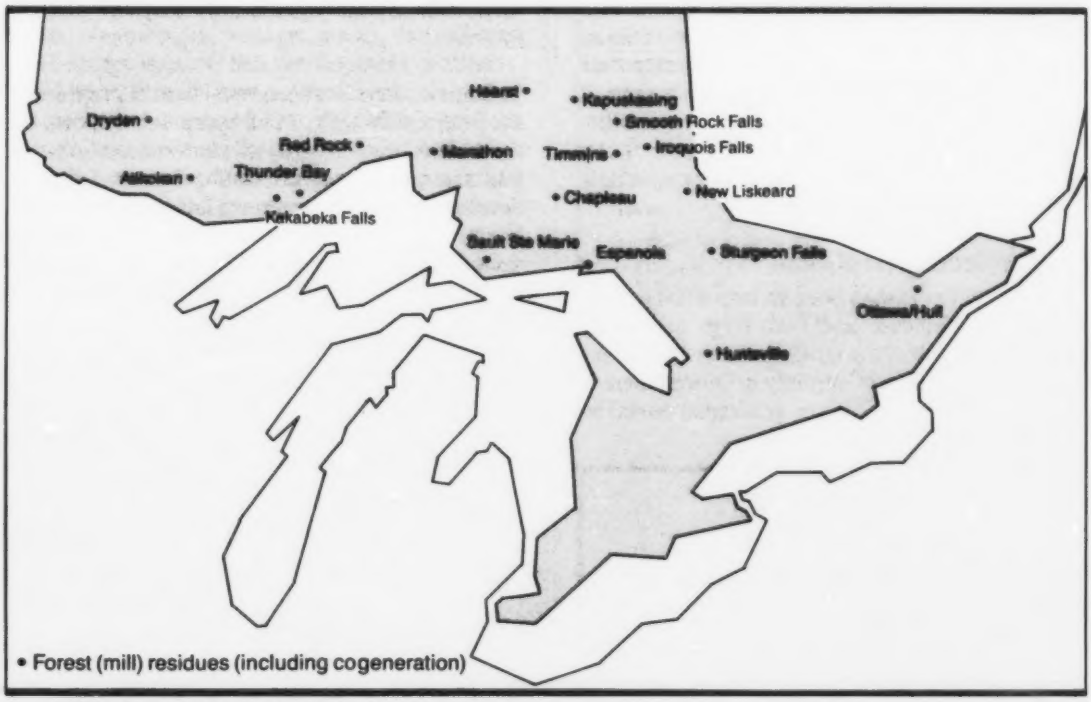
Wood and Wood Waste

Wood and wood waste are important fuels for existing parallel generation capacity in Ontario.

The use of wood waste for cogeneration by the forest products industry is particularly well-established. This industry has access to large quantities of wood waste and forest residues. As energy costs, or the costs of wood waste disposal increase, greater amounts of wood waste are expected to be used as an energy resource.

At present very little electricity generation is fuelled by wood waste outside of the forest products industry. One project that is being developed in Chapleau, Ontario, involves burning wood waste to produce electricity, for sale to Ontario Hydro, and steam for use by a local sawmill. Increased use of this fuel source will depend on conventional energy prices rising, transport costs falling, or generation plants being constructed close to existing sources of wood waste.

Certain innovations in the processing of wood, especially densification, have recently been developed, and these could increase the applicability of wood burning technology by reducing transportation costs. In Ontario, plants using the densification technology have operated at Hearst and Iroquois Falls to produce wood pellets for residential heating and industrial applications.



Some mills where wood waste is used as an energy source
The energy-intensive pulp and paper industry has been using wood waste since before the Second World War. Mills throughout Ontario currently meet about 40 per cent of their energy needs through wood waste.

The use of "energy farms" that use tree plantations to produce wood fuel has been suggested as one means of dramatically increasing the use of wood for energy production. The potential for tree plantations is very large, in terms of the total land area which could conceivably be converted. However, the economics are not presently favorable and the environmental impacts of large-scale plantations have not yet been studied extensively.

The potential for the use of wood and wood waste in Ontario for industrial applications is considered to be large, and could amount to hundreds of megawatts. However, it is unclear how much of the energy potential will be used for electricity production as opposed to steam production. Use of wood and wood waste is also expected to increase in importance for residential and commercial heating purposes.

Municipal Solid Waste

Solid waste disposal in urban parts of Canada has created a number of problems, as the amount of waste for disposal has increased. Existing landfill sites are being used up, and approval of new sites is often difficult and costly to obtain. The use of a solid waste-burning plant to recover useful energy, and to greatly reduce the volume of waste for landfill, is also an option for some municipalities.

A four-megawatt plant in Hamilton, Ontario is the only facility in Canada now providing power to the electricity grid. There are also several projects which are in various stages of development. A project in London, Ontario, is expected to be on-line in 1987.

A number of recent developments could slow the future development of municipal solid waste plants. Energy prices have stabilized; public concern has been raised about emissions (plants can only proceed when there is an acceptable response to the concerns expressed); disposal costs have not risen to the level expected; and government expenditures at all levels have been reduced.

Energy From Waste Projects	Possible Use of Waste Matter (tonnes/year)	Type	Potential* Energy Recovery (Terajoules/year)
Hamilton – Tricil/SWARU (existing)	110,000	Steam/Electricity	730
London – Victoria Hospital	90,000	Steam/Electricity	600
North Bay – Nordfibre	30,000	Steam	200
Toronto – District Heating Incinerator	380,000	Steam	2,500
Kitchener-Waterloo – Energy From Waste	66,000	Steam	540
Kitchener Landfill Gas Project (existing)	—	Landfill Gas	30
Lakeview Water-Pollution Control Plant Energy Recovery system (under construction)	—	Steam	930
Peel – Domtar	120,000	Steam/Electricity	800
Mississauga – St. Lawrence Cement	225,000	Refuse Derived Fuel	1,300

*actual displacement will depend on the number of customers and usage, 1 terajoule equals 278,000 kWh

Note: Unless otherwise indicated, these projects are under evaluation. Not all of them may go ahead since some of them might compete for the same refuse.

Some existing and proposed renewable energy projects in Ontario
Municipal solid waste installations offer immediate opportunities to demonstrate the use of renewable energy.

Wind Generators

The technological advancement of windmills has been under way in a number of countries (e.g., United States, Canada, Germany, United Kingdom) since the early 1970s. This development has produced machines which take advantage of advances in materials technology, aerofoil design, and control systems and which can generate electricity on a large scale.

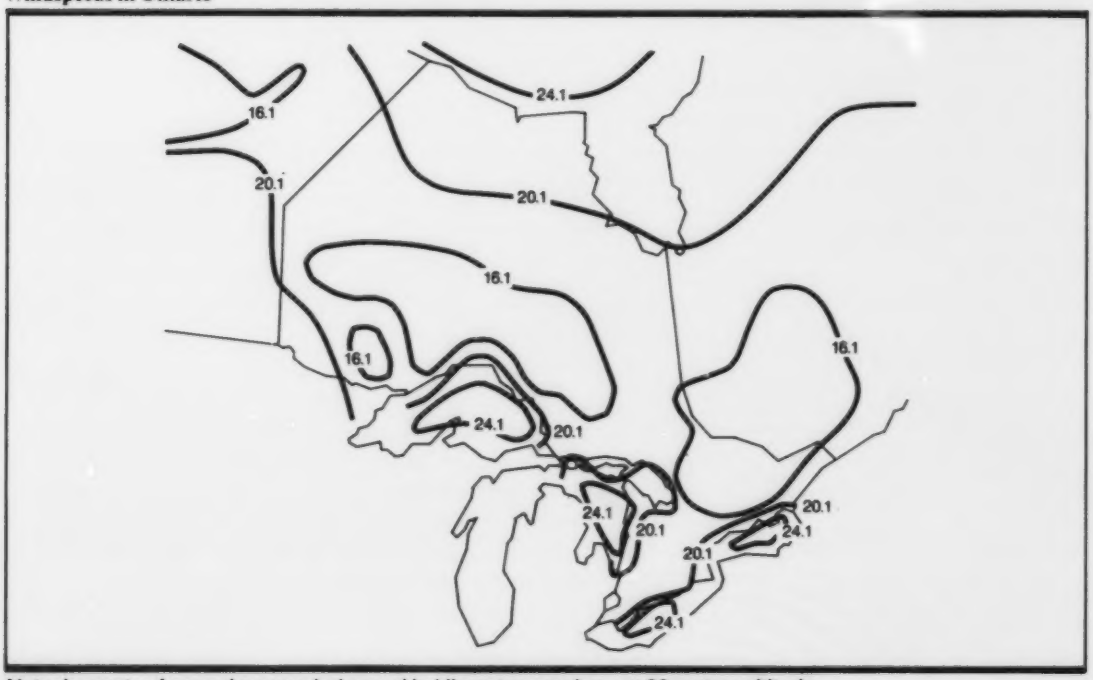
Traditional designs have commercial histories. More modern designs, commercialized in the past few years, have shorter operational histories and still are not proven over their predicted life (15 to 30 years).

A substantial wind farm business has been established in several locations, most notably the state of California. These wind farms are the result of certain unique circumstances, including strong winds close to transmission, the high price utilities pay for electricity, and the availability of generous tax incentives.

In Canada, wind generation is expected to make a small but increasing contribution to serve electricity demand in areas distant from the electricity grid. In these remote areas, electricity generation is primarily based on expensive diesel fuel. A three megawatt wind farm, on the Magdalen Islands in the Gulf of St. Lawrence, is to be completed before the end of 1986.

Wind power may also contribute to provincial electricity grids in parts of Canada where average windspeeds are greater than 20 km/hr.

Windspeeds in Ontario

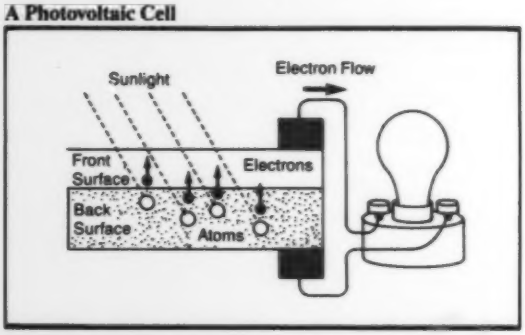


Note: Isovents of annual mean wind speed in kilometres per hour at 30 metres altitude

Photovoltaics

Photovoltaics involves the direct conversion of solar radiation to electricity by semi-conductor devices. The technology for manufacturing photovoltaic cells was established in the early 1960s for the U.S. space program. The cells produced at that time were efficient, but their high cost prevented their application in other markets. Major research and development programs were launched in several parts of the world in the 1970s, and cell costs have been dramatically reduced.

A Photovoltaic Cell



A substantial third-world market currently exists, where photovoltaic systems are used for running water pumps, communication facilities and for supplying electricity to small villages.

In Ontario the main applications are installations where relatively small amounts of power are needed to operate a facility distant from the grid. Such uses include navigational aids, communication devices and monitoring and sensing equipment. The only grid-connected systems operating in Ontario at the present time are test units.

More applications will become practical as the cost of photovoltaic energy drops. The price (in 1985 dollars) for the photovoltaic cells has already fallen by a factor of six in the last 10 years. Many experts predict equally striking reductions in the future.

Fuel Cells

The fuel cell concept was invented in the 1800s and found its first commercial application with the Apollo space program. The technology has continued to develop with an experimental 4.8 megawatt generating plant recently installed in Tokyo.

A fuel cell is an electrochemical device similar to a battery which converts chemical energy directly to electrical energy. Fuel is combined with oxygen in what is essentially a slow combustion process. The process produces electricity and heat.

Fuel cell systems may be designed to operate on coal-derived fuel. Due to low pollution and noise levels fuel cells could be sited in downtown areas where significant distribution difficulties exist. With heat recovery capability, the future economics of natural gas fuelled units looks promising.

First generation utility fuel cells are currently being evaluated at sites in the United States, Japan and Canada. The potential for use of these systems in Ontario will be better understood once development and demonstration projects have been evaluated.

Total Energy Units

A specific type of cogeneration which may find wide use in the commercial sector involves "Total Energy Units".

These small package units are designed to produce both electricity and hot water. A typical total energy unit drives an electrical generator using automobile engine technology. Hot water or steam is developed from the engine cooling system, while electricity is produced by a generator. The potential individual applications for this equipment are sports halls, schools, offices, hospitals, farms, multi-unit residential buildings and small industry.

DEVELOPING PARALLEL GENERATION PROJECTS

It is important to recognize that the individuals and groups which develop parallel generation will have different perspectives. In some cases it will be developed largely to meet site electricity needs; in other cases large amounts of electricity will be sold to the electricity grid.

Recognizing Opportunities for Parallel Generation

The first steps in developing a parallel generation project are to identify, analyse and evaluate the options that exist. In the industrial sector, for example, parallel generation opportunities may be available where a combustible waste (e.g. wood waste) is being produced as a result of the industrial process(es) or where conventional fuels exist and site heat demands are substantial. Local geography may present a suitable site for a small hydro installation or wind turbine. In the future, sites with an abundance of sunshine and with electricity needs which match daylight hours may present opportunities for the use of photovoltaics.

A photovoltaic array near Atikokan

The analysis of the opportunities and options for parallel generation requires a thorough knowledge of the performance, reliability and cost of the technologies which are under consideration. A variety of plant sizes and configurations may be considered. Choosing the right set or combination of components will be important to the success of the project.

Once preliminary analysis has identified a development opportunity, research is required to define the economics of the project. Also, the necessary permits and regulatory approvals should be identified.

Evaluating the Economics

The economics of a parallel generation project will depend on:

- total benefits – the value of the electricity (or heat and electricity) produced, plus other benefits from the project
- total costs – the capital and operating costs of the project

When parallel generation projects are developed to help meet demand for electricity at a particular site a portion of the electricity may be valued at the cost of the electricity purchases, or potential purchases, which are displaced. Electricity produced by parallel generation which is in excess of site requirements may be sold to Ontario Hydro or the local municipal utility.

Two considerations are involved when electricity is bought and sold. The rates are based either on energy (measured in kilowatt hours) or on both energy and capacity (measured in kilowatts). The capacity charge is for the maximum amount of power that has been drawn from the electricity system during any one hour interval over the billing

period. The energy charge is for the total amount of electricity actually used over the billing period. In Ontario electrical energy can cost between 2¢/kWh to over 13¢/kWh depending on the location, customer class and level of electricity use. For industrial customers, charges for capacity may also be relevant and can range from $6.50 to $10.00 per kilowatt per month.

In some situations parallel generation may be developed for the sole purpose of selling all the electricity production to the grid. In other situations only small portions of total electricity production may be sold. For technologies which make use of highly variable energy sources (such as windpower or solar power) a large portion of total plant output may occur when on site power requirements are low.

At these times excess electricity production would be sold to the grid. The economics of the projects with major sales to the grid often hinge on the power purchase rates offered by Ontario Hydro or the municipal utility.

Electricity is generated from waste at this plant in Hamilton

Purchase rates can be less important in other situations where output from the parallel generation project is easily controlled or where consumption of electricity on site is large relative to site capacity. With cogneration plants or plants burning municipal solid waste and having sufficient waste storage space, electrical output can be scheduled to match site use. Reduced annual output from the parallel generator would occur when purchase rates are substantially lower than the cost of electricity from the grid.

Other benefits to the developer of parallel generation projects include reduced uncertainty of future electricity costs and increased reliability of future electricity supplies. The development of parallel generation also results in greater diversity in the provincial electricity system.

The capital costs of parallel generation projects will depend on a host of factors including the size of the project, the technology chosen, financing options, and the efficiency of project management when the construction is underway.

In Ontario parallel generation projects have varied in size from a few kilowatts to several hundred megawatts. The capital costs also vary with the choice of technologies and currently range from several hundred dollars per kilowatt, for typical cogeneration projects, to several thousand dollars per kilowatt for small hydro.

Financing for parallel generation projects can be found through a number of sources. The rate of return demanded from the project often depends on the source of the financing and the level of risk associated with the project. For each project there may be difficult contractual, ownership, financing and risk transfer issues that must be resolved.

The operating, fuelling and maintenance costs are all ongoing expenses which may change significantly over the life of the project.

Approvals and Regulations

With the development of all energy technologies, regard must be had for regulations concerning electrical safety, environmental impact, land use, building codes, and zoning by-laws.

Those wishing to develop small hydro sites, for example, must submit a summary statement of the expected environmental impacts of the proposed project. This statement will be examined by representatives of the provincial Ministries of Natural Resources and the Environment, the local municipality, and the local conservation authority. This submission, like most of those required for the project, should be coordinated through the local district office of the Ministry of Natural Resources.

With small hydro development the Ministry of Natural Resources is able to advise potential developers of the requirements to be satisfied and will provide guidance on how to conduct the assessment or proceed with the submission. Depending on the nature and scale of the project, the assessment submitted may be as brief as two or three pages. For larger installations, or one requiring the construction of a new dam, a more-detailed analysis is required. The assessment may result in a requirement that the project include certain mitigating measures to reduce adverse environmental impacts. For example, if interference with fish passage is predicted, the developer may be required to incorporate a fish ladder or fishway into the design.

The acceptance of this assessment enables the developer to proceed with other approvals that may be necessary. The following list presents other statutes which may be relevant to hydraulic parallel generation projects:

A small hydro site at the Elora Mill

- The Federal Environmental Assessment and Review Process
- The Ontario Environmental Assessment Act
- The Navigable Waters Protection Act
- The Beds of Navigable Waters Act
- The Lakes and Rivers Improvement Act and the Canadian Fisheries Act
- The Conservation Authority Act
- The Ontario Water Resources Act
- The Power Corporation Act – Electrical Safety Code

Other approvals, associated with building codes and zoning by-laws, may also be required.

The approval requirements for other technologies should be approached on a case-by-case basis.

A number of publications relevant to parallel generation in Ontario are listed in the following section.

FOR MORE INFORMATION

More information on Government programs which may be of interest to groups considering parallel generation projects can be obtained from:

The Ontario Ministry of Energy
Inquiries Section
56 Wellesley St. W.
9th Floor
Toronto, Ontario
M7A 2B7

Phone: 416-965-3246
(Long distance ask for Zenith 80420)

Information about technical requirements for interconnection can be obtained from Ontario Hydro through the Manager – Marketing, in their regional offices.

The following publications contain detailed information about Parallel Generation in Ontario:

1. Streams of Power (A handbook on small hydro by the Ontario Ministry of Energy), published by Renewable Energy in Canada, Toronto, 1986.
2. Parallel Generation Interconnection Requirements, Ontario Hydro, 1985.
3. Parallel Generation Rates and Service Conditions, Ontario Hydro, 1985.